

ORIGINAL

Before the  
Federal Communications Commission  
Washington, D.C. 20554

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JUL 17 1995

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

In the Matter of )

Petition for Rulemaking filed by Helping )  
Equalize Access Rights in Telecommunica- )  
tions Now ("HEAR IT NOW") Regarding )  
Section 68.4(a) of the Commission's Rules, )  
Hearing Aid-Compatible Telephones )

RM-8658

DOCKET FILE COPY ORIGINAL

To: The Commission

**COMMENTS OF BELL SOUTH**

BELL SOUTH CORPORATION,  
BELL SOUTH TELECOMMUNICATIONS, INC.,  
BELL SOUTH PERSONAL COMMUNICATIONS, INC.,  
BELL SOUTH CELLULAR CORP.

William B. Barfield  
Jim O. Llewellyn  
1155 Peachtree Street, N.E.  
Suite 1800  
Atlanta, GA 30309-2641  
(404) 249-4445

Charles P. Featherstun  
David G. Richards  
1133 21st Street, N.W.  
Washington, D.C. 20036  
(202) 463-4132

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## **TABLE OF CONTENTS**

<b>SUMMARY .....</b>	<b>1</b>
<b>DISCUSSION .....</b>	<b>3</b>
<b>I.     A RULEMAKING TO ELIMINATE THE EXEMPTION FOR PUBLIC        MOBILE TELEPHONES WOULD INTERFERE WITH THE PUBLIC        INTEREST BALANCING ALREADY CONDUCTED BY CONGRESS        AND THE FCC AND WOULD OBSTRUCT THE PROMPT ROLLOUT OF        PCS .....</b>	<b>3</b>
<b>II.    A RULEMAKING IS INAPPROPRIATE AT THIS TIME BECAUSE        WIRELESS HEARING-AID COMPATIBILITY ISSUES ARE ALREADY        BEING ADDRESSED BY THE WIRELESS INDUSTRY .....</b>	<b>10</b>
<b>CONCLUSION .....</b>	<b>13</b>

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To: The Commission

**COMMENTS OF BELL SOUTH**

BellSouth Corporation, BellSouth Telecommunications, Inc., BellSouth Personal Communications, Inc., and BellSouth Cellular Corp. (collectively, "BellSouth") hereby submit their comments in response to the Petition for Rulemaking filed June 5, 1995 by Helping Equalize Access Rights in Telecommunications Now ("HEAR IT NOW") regarding amendment of 47 C.F.R. § 68.4(a) to subject PCS and cellular telephones to a hearing-aid compatibility requirement.

**SUMMARY**

BellSouth fully supports the principle of hearing-aid compatibility for wireless services. Nevertheless, a rulemaking at this time to mandate hearing-aid compatibility would significantly interfere with equally important public interest objectives and would delay deployment of PCS and reduce investment in digital cellular service. As a result, grant of the HEAR IT NOW petition could have the effect of making wireless communications less available for all customers, both hearing and hearing-impaired.

Congress and the Commission have previously found that the public interest does not warrant subjecting commercial mobile radio services to a hearing-aid compatibility mandate. Likewise, Congress and the Commission have placed a high priority on the introduction of PCS and other new telecommunications technologies. The Commission did not establish a single technical standard for either digital cellular or PCS but instead allowed market forces to select the most appropriate technologies. The technologies now commercially available for both PCS and digital cellular service—GSM and TDMA—are not yet fully capable of hearing-aid compatibility. Subjecting digital cellular and PCS telephones to a hearing-aid compatibility requirement at this critical stage would make these technologies unavailable for building out digital wireless networks and could lead to the *de facto* establishment of other technologies as standards, in spite of the Commission's decision not to pick the standards. This would greatly slow PCS development and would penalize BellSouth and other companies that have made substantial investments in these new technologies, relying on the Commission's market-oriented policies, and delay the availability of new and expanded wireless services.

Eliminating the exemption for public wireless handsets at this point would undercut the already ongoing voluntary efforts to bring hearing-aid compatibility to these new technologies. The Cellular Telecommunications Industry Association, the Personal Communications Industry Association, and other industry organizations have formed working groups to study the technical issues and arrive at solutions.

Most important, a mandatory standard is not needed to ensure the availability of wireless service to hearing-aid wearers. They have access to such service now, in response to the demands of the marketplace. There are devices currently available on the market that allow many hearing-impaired Americans to use standard analog cellular phones with their hearing aids. BellSouth is fully committed to making its wireless services accessible to all Americans.

## DISCUSSION

BellSouth fully supports the principle of hearing-aid compatibility for wireless services. Nevertheless, a rulemaking to mandate hearing-aid compatibility for PCS and cellular telephones would result in delayed deployment of PCS and reduced investment in digital cellular service, thus reducing the availability of wireless communications for all Americans, including the hearing-impaired.

### **I. A RULEMAKING TO ELIMINATE THE EXEMPTION FOR PUBLIC MOBILE TELEPHONES WOULD INTERFERE WITH THE PUBLIC INTEREST BALANCING ALREADY CONDUCTED BY CONGRESS AND THE FCC AND WOULD OBSTRUCT THE PROMPT ROLLOUT OF PCS**

Congress and the Commission have previously found that the wireless telephones used in conjunction with commercial mobile radio services should be exempt from the a hearing-aid compatibility mandate. The hearing-aid compatibility requirements contained in 47 C.F.R. § 68.4 were adopted in response to the Hearing Aid Compatibility Act of 1988 (the "HAC Act"),<sup>1</sup> which "balances the interests of hearing aid users, telephone manufacturers, and the general public."<sup>2</sup> As part of this balancing process, Congress recognized that "certain kinds of telephones," such as those used in conjunction with commercial mobile services, "cannot be made [hearing-aid compatible] today."<sup>3</sup> The legislative history reflects that Congress knew that full operational compatibility between mobile telephones and hearing aids was "impossible" due to the ambient noise and

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<sup>1</sup> Pub. L. No. 100-394, 102 Stat. 976 (1988).

<sup>2</sup> S. Rep. No. 100-391, 100th Cong., 2d Sess. 7 (June 22, 1988), *reprinted in* 4 U.S.C.C.A.N. 1345, 1351 (1988).

<sup>3</sup> S. Rep. No. 100-391 at 7, *reprinted in* 4 U.S.C.C.A.N. at 1351.

electromagnetic fields associated with mobile telephones, which can interfere with hearing-aid use.<sup>4</sup> Accordingly, the HAC Act provided that “telephones used with public mobile services” were to be exempt from the hearing-aid compatibility requirement, in order not to inhibit the rapid growth of these services,<sup>5</sup> and the FCC, when implementing the HAC Act, exempted the telephones used in conjunction with commercial mobile radio services, because the potential for interference between such telephones and hearing aids made them operationally incompatible.<sup>6</sup>

Congress provided a specific procedure for revisiting this exemption. To revoke or limit the exemption, the FCC must make four findings:

- that revocation or limitation of the exemption “is in the public interest”;
- that continuing the exemption “would have an adverse effect on hearing-impaired individuals;”
- that making the exempt phones hearing-aid compatible “is technologically feasible;” and
- that compliance with the hearing-aid compatibility standard “would not increase costs to such an extent that the telephones . . . could not be successfully marketed.”<sup>7</sup>

BellSouth submits that HEAR IT NOW’s request to eliminate the exemption fails these standards, and accordingly a rulemaking is not warranted at this time.

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<sup>4</sup> H.R. Rep. No. 100-674, 100th Cong., 2d Sess. 13 (June 7, 1988) (“House Report”); *see id.* at 9.

<sup>5</sup> 47 U.S.C. § 610(b)(2)(A)(1).

<sup>6</sup> *Access to Telecommunications Equipment and Services by the Hearing Impaired*, CC Docket 87-124, *First Report and Order*, 4 F.C.C.R. 4596, 4600, 4601 (1989); 47 C.F.R. § 68.4(a)(1).

<sup>7</sup> 47 U.S.C. § 610(b)(2)(C)(i)-(iv); *see* 47 C.F.R. § 68.4(a)(4). *See also* House Report at 13 (“In any future reconsideration of this exemption, the Commission shall consider the technological feasibility and cost effectiveness of requiring compatibility and the communications needs of the hearing impaired.”)

Most fundamentally, eliminating the exemption and subjecting all cellular and PCS telephones to a hearing-aid compatibility requirement is manifestly *not* in the public interest. Congress and the Commission have found that the public interest requires the prompt introduction of PCS and other new telecommunications technologies, such as digital cellular. In Sections 7 and 309(j) of the Communications Act, Congress required the FCC to make new services and technologies available with a minimum of delay,<sup>8</sup> and in 1993, Congress set tight deadlines for expediting PCS rulemaking and licensing in particular.<sup>9</sup> In response, the Commission made prompt deployment and licensing of PCS one of its highest public interest objectives.<sup>10</sup> Moreover, to avoid the delays and litigation involved in setting technical standards for evolving services such as digital cellular and PCS through complex rulemaking proceedings, the FCC found that the public interest warranted flexible technical rules that allow technical developments to be tested in the marketplace as soon as they are ready.<sup>11</sup>

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<sup>8</sup> Section 7 of the Communications Act establishes a policy of encouraging the introduction of new technologies and services and sets a one-year deadline for FCC authorization of new technologies and services. 47 U.S.C. § 157(a)-(b). Section 309(j) requires the FCC to promote “development and rapid deployment of new technologies, products, and services . . . without administrative or judicial delays” and “investment in and rapid deployment of new technologies and services.” 47 U.S.C. § 309(j)(3)(A), (j)(4)(C)(iii).

<sup>9</sup> Omnibus Budget Reconciliation Act of 1993, § 6002(d)(2), Pub. L. No. 103-66, 107 Stat. 396 (1993).

<sup>10</sup> *New Personal Communications Services*, Gen. Docket 90-314, *Notice of Proposed Rulemaking and Tentative Decision*, 7 F.C.C.R. 5676, 5678, 5679 (1992); *Second Report and Order*, 8 F.C.C.R. 7700, 7709 (1993); *Memorandum Opinion and Order*, 9 F.C.C.R. 4957, 4960, 4974, 5021 (1994); *Competitive Bidding*, PP Docket 93-253, *Fourth Memorandum Opinion and Order*, 9 F.C.C.R. 6858, 6964 (1994) (“overriding public interest in rapid introduction of service to the public”); *Fifth Report and Order*, 9 F.C.C.R. 5532, 5547 (1994); *Second Report and Order*, 9 F.C.C.R. 2348, 2358, 2361 (1994); see *Deferral of Licensing of MTA Commercial Broadband PCS*, GN Docket 93-253, *Order*, DA 95-806 (W.T.B. Apr. 12, 1995).

<sup>11</sup> *E.g.*, *New Personal Communications Services*, Gen. Docket 90-314, *Second Report and Order*, 8 F.C.C.R. at 7755-56; *Memorandum Opinion and Order*, 9 F.C.C.R. at 5021-22.

This regulatory flexibility has benefited the public. In cellular, two digital alternatives to the analog AMPS (Advanced Mobile Phone Service) standard have evolved in response to market demands: a TDMA (Time Division Multiple Access) system known as Digital AMPS and a CDMA (Code Division Multiple Access) technology. Each appears to have its own advantages: TDMA is commercially available now and is making sufficient additional capacity available promptly for continued cellular expansion, while CDMA may multiply cellular capacity even more, but is not yet commercially available.

In PCS, a variety of digital transmission standards are being developed in reliance on the FCC's decision to leave the standards to the industry. These are principally based on TDMA and CDMA technology. The TDMA systems are based on the GSM (Global System for Mobile) and DECT (Digital European Cordless Telecommunications) standards used for digital cellular and microcellular service throughout Europe and in many other nations. United States adaptations of these TDMA systems are commercially available and ready for immediate deployment, because they are based on technology already in wide use. Several proprietary CDMA systems are also being developed, but are not yet commercially available. Accordingly, the technology most capable of fulfilling the public interest in rapid deployment of PCS is a United States adaptation of the GSM/DECT TDMA technology.

Elimination of the hearing-aid compatibility exemption for phones used in commercial mobile systems would seriously disserve the public interest because it would make prompt rollout of PCS impossible and could even eliminate the capacity gains achieved through Digital AMPS. This is because the TDMA phones used for digital cellular and for PCS systems based on GSM technology are not, at this point, fully compatible with hearing aids. TDMA technology uses 100% square wave amplitude modulation of the carrier to derive multiple time slots for transmission of information. This modulation is demodulated by some hearing aids (particularly those without



adequate shielding), when in close proximity to a TDMA phone, appearing to the listener to be a buzzing sound.<sup>12</sup> Accordingly, a hearing-aid compatibility requirement for the phones used in commercial mobile systems would have the immediate effect of limiting the available technology to the fifteen-year-old AMPS analog standard.

Moreover, while AMPS analog cellular phones are *electromagnetically* compatible with hearing aids (*i.e.*, they do not interfere with hearing aid use), the analog cellular phones on the market today are not generally capable of electromagnetic coupling with a telecoil-equipped hearing aid unless an adapter is used. The telecoil is typically required to meet the wireline telephone hearing-aid compatibility requirement,<sup>13</sup> although this technology is not required by the HAC Act.<sup>14</sup>

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<sup>12</sup> It is presently unclear whether CDMA equipment would be electromagnetically compatible with hearing aids, particularly since CDMA equipment for cellular and PCS is not yet commercially available.

<sup>13</sup> Most external hearing aids have a built-in telephone pick-up, or "telecoil," which is activated by a switch on the hearing aid. When this switch is placed in the "telephone" position, the microphone is turned off and the hearing aid can be used at full volume without feedback and with minimal background noise. These hearing aids are activated by the magnetic field generated by telephone handsets. In-the-ear hearing aids generally rely on audio amplification rather than electromagnetic coupling (and a telecoil) to provide the wearer with telephone access. Unless otherwise indicated, references to hearing aid compatible telephones refer to equipment which is compatible with a telecoil type hearing aid. . . .

*First Report and Order*, 4 F.C.C.R. at 4602 n.3.

<sup>14</sup> "The bill . . . does not mandate any particular type of technology. Induction coupling and electromagnetic fields are not even mentioned." Senate Report at 8.

Nevertheless, small, low-power devices, such as portable phones, may be incapable of generating the electromagnetic signal required for coupling to a telecoil.<sup>15</sup>

Thus, eliminating the hearing-aid compatibility exemption for phones used in connection with commercial mobile systems (1) would delay the availability of PCS, contravening the Commission's determination that the public interest requires rapid deployment of PCS, (2) would drastically limit, if not eliminate, the availability of digital cellular service, and (3) as a result, would cause an increase in demand for analog cellular service, for which there is insufficient capacity. BellSouth submits that this result is plainly contrary to the public interest.

It is not clear that continuing the exemption would adversely affect hard-of-hearing persons. While some hearing-aid users would not be able, in the immediate future, to use TDMA-based wireless phones,<sup>16</sup> they could continue to use analog cellular phones. Analog phones are compatible

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<sup>15</sup> In 1982, the Committee Report accompanying the Telecommunications for the Disabled Act of 1982, Pub. L. No. 97-410, 96 Stat. 2043(1982), recited the testimony of an AT&T official:

[F]uture telephone technology . . . is moving toward low-power, lightwave and digital systems. These future systems are expected to use new types of receiver units which will offer many advantages: smaller size, lighter weight, improved voice quality reception, significantly lower manufacturing costs and correspondingly lower consumer rates. Unfortunately, these future systems will also make built-in inductive coupling capability prohibitively expensive.

H.R. Rep. No. 97-888, 97th Cong., 2d Sess. 6 (Sept. 28, 1982), *reprinted in* 1982 U.S.C.C.A.N. 3564, 3568.

<sup>16</sup> HEAR IT NOW alleges, based on a number of overseas studies, that TDMA-based phones can interfere with hearing-aid usage at some distance. This appears to have been a relatively isolated occurrence in the tests, which indicated a much greater likelihood of interference when the hearing aid is in close proximity to the phone. TDMA phones are not the only equipment that can cause interference to hearing aids, according to those studies; hearing-aid wearers can also experience buzzing and similar noises when in proximity to fluorescent lights, computers, anti-theft devices, and other electronic equipment. Moreover, the studies cited by HEAR IT NOW generally used GSM phones with different technical parameters (*e.g.*, higher power levels) from those that will be applicable in the United States. Accordingly, the results of those studies are of questionable relevance in determining the degree of interference to be expected from TDMA-based cellular and

with hearing aids that rely on audio amplification rather than telecoils, and there are adapters available for hearing-aids with telecoils to allow use of many cellular phones. Moreover, the migration of some hearing subscribers from analog cellular systems to either digital cellular or PCS would make more analog cellular capacity available to hearing-aid wearers.

It is also by no means clear that making the exempt commercial mobile phones hearing-aid compatible is technologically feasible. Few, if any, analog cellular phones are compatible with telecoil-equipped hearing aids. The low-power electronic circuitry of a cellular phone does not inherently generate an electromagnetic field sufficient for telecoil pickup, as wireline telephones do. Thus, a cellular phone can only be used with a telecoil if it is specifically designed to generate such a field. This places significant design constraints upon the phone (size, shape, battery capacity, etc.) that may not be technologically feasible in many cases.<sup>17</sup> Moreover, the signals inherently emitted by TDMA-based phones may render it technically infeasible for these phones to be compatible with telecoil pickup. In addition, even if it were feasible to make cellular and PCS phones technically compatible with telecoil-equipped hearing aids, it is unclear whether this could be accomplished at a cost that would still allow the phones to be marketable. HEAR IT NOW's petition addresses none of these points, and its petition should be denied for that reason alone.

As described in the attached affidavit of Scott Fox, BellSouth has invested a great deal of capital in preparation for providing new wireless services based on TDMA. BellSouth's cellular affiliates currently offer TDMA cellular service to 27,500 customers. BellSouth Personal Communications, Inc., has selected GSM-based PCS technology for its two PCS markets, in reliance

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PCS phones in the United States. In any event, the studies cited by HEAR IT NOW do not support its contentions, as is shown in the comments of the Cellular Telecommunications Industry Association and the GSM MoU.

<sup>17</sup> See note 15, *supra*.

on the FCC's decision to leave the PCS technology to the licensee's discretion and in furtherance of the Commission's objective of a prompt deployment of PCS. In fact, BellSouth's bids for licenses were based on financial projections premised on the availability of GSM-based PCS technology. Accordingly, BellSouth has entered into binding contracts for GSM-based PCS infrastructure equipment and has incurred major expenses in preparing a business plan aimed at launching its PCS service as early as possible, with the objective of being first to market. As a result of these investments and commitments, any action by the Commission that impairs the viability of GSM-based PCS will impose dramatic financial consequences on the provision of wireless services by BellSouth and other similarly situated PCS licensees and will imperil the ability of PCS to succeed in the United States.

**II. A RULEMAKING IS INAPPROPRIATE AT THIS TIME BECAUSE WIRELESS HEARING-AID COMPATIBILITY ISSUES ARE ALREADY BEING ADDRESSED BY THE WIRELESS INDUSTRY**

BellSouth submits that it would be inappropriate to initiate a rulemaking at this time in response to the HEAR IT NOW petition because of ongoing voluntary efforts to study the issue of wireless service hearing-aid compatibility. As noted above, the studies relied upon by HEAR IT NOW were conducted abroad, using wireless phones with different specifications (frequencies, power levels, etc.) from those that will be used in the United States. Moreover, the hearing aids used in those studies may differ significantly from those in common usage in the United States. Accordingly, the foreign studies are only of little or no help in determining the electromagnetic compatibility of various wireless technologies with hearing aids.

Industry organizations such as the Cellular Telecommunications Industry Association ("CTIA") and the Personal Communications Industry Association ("PCIA") have already undertaken studies and formed working groups to address the technical issues and arrive at

solutions. CTIA announced on July 10, 1995 that work had previously begun between the wireless industry and hearing-aid manufacturers, together with the Center for Study of Wireless Electromagnetic Compatibility at the University of Oklahoma on a study to be completed within six months. That study will test GSM, CDMA, and TDMA cellular technology.<sup>18</sup> On the same date, PCIA announced that its Electromagnetic Compatibility Task Force is gathering information about wireless interference to hearing aids that will form the basis for equipment tests.<sup>19</sup>

Once the test results are in, the FCC will have a solid factual basis for evaluating the nature and extent of any interference problem that may exist and the technical and economic feasibility of adding hearing-aid compatibility to the phones used in conjunction with commercial wireless systems. Based on that evaluation, the Commission can then determine whether a notice of inquiry or a negotiated or conventional rulemaking is warranted to modify or eliminate the exemption, or whether the exemption should continue in place.

In BellSouth's view, a mandatory standard is not needed (and will not be) to ensure the availability of hearing-aid compatible wireless service. Wireless service is accessible to many hearing-aid wearers now, in response to the demands of the marketplace, and the industry's efforts will lead to even more compatibility between wireless services and hearing aids.

While today's portable cellular phones cannot generally be used with telecoil hearing aids, cellular phones can be used by many hearing-impaired customers in conjunction with hearing aids that rely on audio amplification. The work of the Center for Study of Wireless Electromagnetic Compatibility at the University of Oklahoma may also result in improvements in TDMA-based phones and in hearing aid technology that will make digital cellular and PCS phones more accessible

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<sup>18</sup> *Industry Begins Study of Hearing Aid Interference by Digital Mobile Phones*, Communications Daily 1 (July 11, 1995).

<sup>19</sup> *Id.* at 1-2.

to hearing-impaired individuals. In addition, there are devices currently available on the market that allow many Americans to connect standard analog cellular phones electronically to their hearing aids. For example, the Hearing Aid Telephone Implementation System ("HATIS") has been developed by Phoenix Management, Inc. HATIS allows profoundly hearing-impaired individuals to use a cellular phone by providing a connection between the cellular phone and the telephone pickup jack of a bone induction hearing aid.<sup>20</sup>

BellSouth is fully committed to making its wireless services accessible to all Americans. A recent BellSouth test of HATIS indicates that for individuals capable of using a bone induction hearing aid, it can be highly effective. BellSouth is committed to making adapter kits, such as HATIS, available to its cellular customers. BellSouth will also explore other ways to make its wireless services accessible to hearing-impaired customers.

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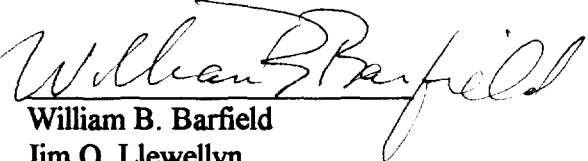
<sup>20</sup> *See Attachment.*

## CONCLUSION

For the foregoing reasons, BellSouth respectfully asks the Commission to deny the petition for rulemaking filed by HEAR IT NOW.

Respectfully submitted,

BELLSOUTH CORPORATION,  
BELLSOUTH TELECOMMUNICATIONS, INC.,  
BELLSOUTH PERSONAL COMMUNICATIONS, INC.,  
BELLSOUTH CELLULAR CORP.

By: 

William B. Barfield  
Jim O. Llewellyn  
1155 Peachtree Street, N.E.  
Suite 1800  
Atlanta, GA 30309-2641  
(404) 249-4445

By: 

Charles P. Featherstun  
David G. Richards  
1133 21st Street, N.W.  
Washington, D.C. 20036  
(202) 463-4132

*Their attorneys*

July 17, 1995

## AFFIDAVIT OF HENRY SCOTT FOX

Personally appeared before me, the undersigned officer duly authorized by law to administer oaths, Henry Scott Fox, who, after being duly sworn, deposes and states as follows:

### 1. BACKGROUND AND QUALIFICATION

A. My name is Henry Scott Fox. I am Vice President--Engineering and Operations of BellSouth Personal Communication, Inc. ("BellSouth") My business address is 3353 Peachtree Road, N.E., Suite 300, Atlanta, Georgia 30326.

#### B. Educational background:

I have a Bachelor of Science degree in Electrical Engineering (BSEE) which I received in 1981 from the College of Engineering, University of Florida. My area of specialization is Digital Communications.

#### C. Work Background:

I have spent the past 15 years in a broad variety of senior technical management positions focused on all engineering and operations aspects of conventional mobile telephone, paging, cellular, and PCS. I have been responsible for directing the design, implementation, optimization, operation and evolution of some of the largest systems in the nation. During this time, I have consistently been promoted to positions of increasing responsibility. A copy of my resume is attached.

#### D. Present Position and Responsibility:

I am presently Vice President - Engineering and Operations for BellSouth Personal Communications, Inc. In this position, I am responsible for all technical aspects related to the design, implementation, optimization and operation of BellSouth's Personal Communications Systems in the domestic United States.

2. In its Petition for Rule Making filed with the Commission on June 5, 1995, HEAR-IT-NOW proposed an amendment to the Commission's rules to require that broadband PCS devices capable of voice transmission or reception be hearing aid-compatible. In that petition, HEAR-IT-NOW singled out GSM technology for criticism and stated that: "Since no PCS devices are currently in operation in the United States, no existing users will be affected. Furthermore, there is no GSM-dependent infrastructure in place that would be subject to costs related to compliance."



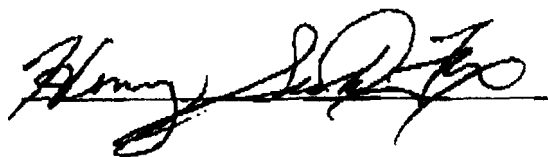
3. On June 23, 1995, BellSouth was awarded the channel block "B" broadband PCS licenses for MTAs M006 and M044 (Charlotte and Knoxville). BellSouth has proceeded with an aggressive schedule of deployment to meet its goal of being "first to market" with a next-generation PCS network. The purpose of this affidavit is to describe the status of BellSouth's deployment of its PCS networks utilizing GSM technology, and to assess the potential costs that would be incurred by BellSouth were the Commission to require a change in technology.
4. BellSouth began work on the study and development of Personal Communications Services in 1989 when, in partnership with other companies, responded to an request by the British government for a Personal Communications Network. In 1992, BellSouth was an active participant in the consortium which won a license for a nationwide PCS license in Germany. Since 1993, a dedicated team of subject matter experts from BellSouth Telecommunications, Inc., BellSouth Cellular Corp., and other parts of BellSouth Corporation supplemented by telecommunications industry consultants have focused on the development of Personal Communications Services for the US marketplace. It was determined that time-to-market was a critical factor in the successful deployment of BellSouth's service offering. To meet the time-to-market and feature/functionality requirements, an exhaustive technology assessment was conducted over an 18 month period. During this time, extensive research was conducted through active participation in industry technology committees and with equipment manufacturers. All of the wireless technologies proposed for PCS deployment were analyzed. In early 1994, it was determined that the GSM-based DCS1900 proved best able to meet BellSouth's service requirements. DCS1900 was shown to be the lowest risk technology to meet aggressive time-to-market requirements due to its commercial operation in PCS systems in Europe along with the advantages shared with its GSM parent technology of a mature open architecture, superior digital voice quality, worldwide production volumes and complete network architecture definition.
5. BellSouth Personal Communications determined that an aggressive "first-to-market" deployment is critical to implement its service strategy and provide a viable business in PCS. To that end, a decision was made to proceed "at-risk" with certain pre-implementation activities in the targeted MTAs in advance of the actual auctions. Major staffing efforts in system design and site acquisition resources were begun in mid-1994. By late 1994, most of the engineering and implementation staff was in place. With most of the system design work completed by the end of 1994, over 50% of the proposed sites are now under contract and are proceeding through various stages of zoning and local permitting for construction.
6. On June 16, 1995, BellSouth signed a definitive equipment supply agreement with Northern Telecom, Inc., committing BellSouth to purchase significant quantities of GSM/DCS1900 network infrastructure equipment to build out the networks for the two MTAs BellSouth has been awarded by the F.C.C..

7. As of this date, firm orders have been placed with Northern Telecom for Mobile Switching Centers (MSCs or "switches"), Base Site Controllers (BSCs), Base Transmission Systems (BTSs or cell equipment) and a Home Location Register (HLR) totaling approximately \$30 million. All of this equipment is specifically for the DCS1900 technology and could not be utilized if another technology were deployed. Additionally, other ancillary equipment has been ordered for specific sites. If the technology were to change, specific site design parameters would correspondingly change rendering much of this equipment unusable.
8. To date, a complete system design has been completed for the first three years of service based on the GSM-based DCS1900 technology. Site acquisition activity has been underway since late 1994 in the two MTAs (M006 and M044) yielding over 55% of the sites required for initial service. With zoning and local permitting complete at a number of locations, actual construction is underway in both MTAs. Orders for transport circuits to connect network switch locations and sites have been ordered and scheduled for installation and commissioning in most cities within the two MTAs.
9. The system design completed in 1994, upon which site acquisition activity has commenced, is based on the parameters for a GSM-based network. The actual cell size is a direct function of the radio channel link budget and capacity offered per radio channel. If a change in the proposed technology occurred, a complete system re-design would be dictated requiring many months of re-engineering at a significant cost. In addition, most of the site acquisition activity and expenditures to date would be lost and would be required to start over.
10. Additionally, contracts with equipment vendors have already been signed resulting in guaranteed delivery dates to meet deployment and service plans. A change in technology to one supported by our current infrastructure vendor would, at a minimum, require a complete change in equipment configurations and orders in progress. It can be assumed that delays and significantly later delivery dates would be encountered since factory production is based on forecasts for the DCS1900 technology. If the present vendor under contract does not support the new technology, a complete re-negotiation of products, pricing and delivery dates with a new supplier would be mandated. As all MTA licenses have been issued, it is likely that delivery commitments have also been secured by new licensees. Negotiations begun at this late date would most likely yield significantly later delivery commitments than have been secured under existing contracts.

11. BellSouth's business plan has been based on an exhaustive analysis including the capabilities, costs and commercial availability of the chosen technology. A mandated change in technology calls into question all of the business planning assumptions used in the company's bid for the two MTAs and the future viability of its PCS business. With questions as to commercial availability and performance of alternative technologies, the variables introduced can have a profound effect on BellSouth's continued support of a PCS business.

The factual representations contained in this Affidavit are true and accurate to the best of my knowledge, information and belief.

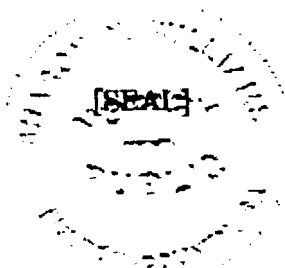
Further the Affiant sayeth not.

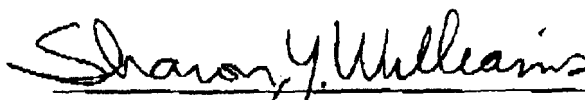


COUNTY OF FULTON     )  
                                      )  
STATE OF GEORGIA     )

The foregoing Affidavit was sworn to and subscribed by me this 17<sup>th</sup> day of July, 1995 by Henry Scott Fox, VP, Eng. + Operations, BellSouth Personal Communications, Inc.

My commission expires Jan. 10, 1999



  
Notary Public

**HENRY SCOTT FOX**  
**3413 Riley Drive • Plano, TX 75025**  
**(214) 491-1224**

## EDUCATION

**Bachelor of Science Electrical Engineering (BSEE) • 1981**  
**College of Engineering • University of Florida**  
**Specialization: Digital Communications**

## EXPERIENCE

**BallSouth Personal Communications, Inc.** **ATLANTA, GA**  
**Vice President - Engineering and Operations**

**Responsible for all technical aspects related to the design, implementation, optimization and operation of BellSouth's Personal Communications Systems in the domestic United States.**

**MCI Telecommunications Corporation** **RICHARDSON, TX**  
**March 1994** **Acting Vice President, Wireless Communications Engineering**  
**to May 1995**

**Responsible for all aspects of MCI's national and international Wireless Communications Engineering.**

- **Business Analysis**
- **Technology Assessment and Planning**
- **Technology Development**
- **Lab Test and Integration**
- **Implementation and Deployment Planning**
- **Operations and Operational Support Systems**
- **Financial Management and Budget Administration**
- **Program Management**

## Director, Wireless Implementation

**Responsible for implementation planning for MCI's Personal Communications Network. This includes project management of MCI's PCS Trials (GSM/TDMA and Qualcomm CDMA), network deployment modeling, engineering and construction standards, RF and switch facilities planning, operations planning, organizational structure development, vendor contract negotiations, financial analysis of various deployment strategies, site acquisition strategy development, materials planning, and project/budget planning.**

**Page 2**  
**Resume of Scott Fox**

**MOBILE MEDIA** **RIDGEFIELD PARK, NJ**  
 Sept. 1992 **Director, Network**  
 to Feb. 1994

Responsible for all engineering and operational aspects for the Eastern Region of the United States for Metromedia Paging Services, a wholly owned subsidiary of Southwestern Bell Corporation. This primarily includes responsibility for all technical personnel and systems in the following states:

- |                   |                 |
|-------------------|-----------------|
| • New York        | • Massachusetts |
| • New Jersey      | • New Hampshire |
| • Pennsylvania    | • Maine         |
| • Delaware        | • Connecticut   |
| • Maryland        | • Vermont       |
| • Washington, DC. | • Virginia      |

**Major Accomplishments:**

- Consolidated the Eastern Region operations into three (3) major Hub locations
- Replaced all BBL/Glenayre Paging Switches with Motorola MPS 2000 Switches
- Developed and managed Capital and Expense Budgets for the Eastern Region
- Approved and tracked Capital Budgets nationwide
- Implemented a Network Control Center (NCC) responsible for centralized management and monitoring of all MIS and Paging Network performance nation-wide
- Designed and implemented new nationwide PCP paging/data network
- Designed and implemented a new nationwide data communications (VAX) network for the company, supporting increase traffic at reduced cost
- Managed the application of new technologies to allow the company growth into new wireless areas
- Created and chaired "New Products and Services Committee"
- Developed and Implemented a formal Disaster Recovery Program for the company
- Developed, implemented, and managed significant cost-savings programs for the region and country

Page 3  
Resume of Scott Fox

- |                                   |  |                          |
|-----------------------------------|--|--------------------------|
|                                   | <b>CELLULAR ONE</b>  | <b>ROCHELLE PARK, NJ</b> |
| <b>Jan. 1990 to<br/>Aug. 1992</b> | <b>Director, Engineering</b>   |                          |
|                                   | <p>Responsible for the design, development, integration, implementation, and optimization of all engineering aspects of the New York / New Jersey non-wireline cellular system. Directly manage the activities of the following departments:</p> <ul style="list-style-type: none"> <li>• RF Optimization Engineering</li> <li>• Cell Implementation Engineering</li> <li>• Systems Engineering (Network, Switch, Traffic, Telco, etc..)</li> <li>• Fraud Engineering</li> </ul> <p>Major Accomplishments:</p> <ul style="list-style-type: none"> <li>• Managed the growth of the Engineering Department and support staff from 3 people in 1989 to 35+ Engineers in four separate groups in 1992.</li> <li>• Managed the growth of the System from 1 switch and 46 cell sites to 9 switches and 200+ cell sites.</li> <li>• Developed and managed annual Expense and Capital budgets</li> <li>• Developed and implemented extensive employee training programs</li> <li>• Developed and implemented 'High-sites' reduction projects</li> <li>• Completed the New York System conversion from Motorola to Ericsson equipment (July 1991).</li> <li>• Implementation of Digital Technology into the New York market (TDMA)</li> <li>• IS-41 Rev. 0 Field Trials between Motorola and Ericsson systems.</li> <li>• Developed and implemented extensive Fraud Identification and elimination programs and projects.</li> <li>• Provided Expert Witness testimony for numerous Zoning and Board of Adjustment Hearings throughout New York and New Jersey</li> </ul> |                          |
| <b>1989 to<br/>1990</b>           | <b>Director, RF Engineering</b>  |                          |
|                                   | <p>Responsible for all RF optimization and implementation aspects of the system. Directly manage the team of engineers responsible for the following:</p> <ul style="list-style-type: none"> <li>• Optimize and maintain the integrity of the existing system while rapidly growing the system to meet subscriber growth.</li> <li>• Develop and implement frequency assignments which allow maximum capacity and minimum interference.</li> <li>• Develop short and long-term expansion plans which provide additional capacity and improved coverage. Evaluate and implement sectorization, cell splitting, and new site implementation to meet these plans.</li> <li>• Select, design, and implement cell sites to meet the above listed criteria</li> <li>• Extensively utilized LCC's ANET model and A.T. &amp; T.'s PACE model for theoretical predictions of optimal cell site performance and interaction</li> <li>• Responsible for all FCC license filings</li> </ul>  |                          |

Page 4

Resume of Scott Fox

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|-------------------------|---|
| <p>1989 to<br/>1989</p> | <p><b><u>METROMEDIA PAGING SERVICES</u></b> <span style="float: right;"><b><u>SECAUCUS, NJ</u></b></span><br/> <b>Director of Engineering</b></p>   |
|                         | <p>Corporate staff position reporting to the vice-president:</p> <ul style="list-style-type: none"> <li>• Provided consultation and analytical support to the operating branches nationwide related to all technical aspects of the business.</li> <li>• Identified new technologies with the potential to benefit the company.</li> <li>• Interfaced with the vendors to implement new technologies into products and equipment to be utilized by the operating branches.</li> <li>• Coordinated the development and maintenance of uniform technical standards to ensure optimal technical performance.</li> <li>• MFJ compliance liaison - Primary liaison between Metromedia Paging and Southwestern Bell (our parent company) regarding all technical issues related to ongoing MFJ compliance.</li> </ul>                                 |
| <p>1987 to<br/>1988</p> | <p><b>Engineering Manager</b></p> <ul style="list-style-type: none"> <li>• Responsible for all technical aspects of Metromedia Paging Services' largest system, the New York/New Jersey operation.</li> <li>• Managed the Network Operations Center and the Field Service operations.</li> <li>• Assisted in the development of the annual Capital and Expense budgets for the New York/New Jersey operating branch. Managed with full Profit and Loss responsibility (greater than \$ 5 million annually).</li> <li>• F.C.C. license responsibility.</li> <li>• Site acquisitions, lease negotiations, and payments.</li> <li>• Systems Engineering: Coverage and channel capacity planning; RF control link/repeater design; simulcast optimization procedures; paging formats and preamble management. Telco traffic engineering.</li> </ul> |
| <p>1986 to<br/>1987</p> | <p><b>Systems Engineer</b></p> <p><u>Responsibilities:</u></p> <ul style="list-style-type: none"> <li>• Evaluation and optimization of regional and national paging and conventional Mobile Telephone systems.</li> <li>• Integration of common RF resources between dissimilar markets.</li> <li>• Development and standardization of technical procedures and documentation.</li> <li>• Alpha-Numeric 'front-end' processor development.</li> <li>• Remote-site monitor and alarming project management.</li> </ul>   |

Page 5  
Resume of Scott Fox

<b>1984 to 1986</b>	<b><u>WESTSIDE COMMUNICATION</u></b> <b><u>GAINESVILLE, FL</u></b> <b>Chief Engineer</b>  Managed all technical aspects of numerous regional and state-wide analog and digital paging systems. Maintained and operated eight conventional mobile telephone systems and two 5-channel Trunked SMR systems. Designed and implemented the first true "Talk-Back" paging system on the East Coast utilizing satellite comparators/voting receivers, simulcast transmitters, and miniature UHF hand-held transceivers.
<b>1981 to 1984</b>	<b><u>RADIO TELEPHONE COMPANY</u></b> <b><u>GAINESVILLE, FL</u></b> <b>Communications Engineer</b>  Responsible for all aspects of numerous paging and mobile telephone systems throughout the state of Florida. Base station repair and paging terminal maintenance.
<b>1979 to 1981</b>	<b>Technician</b>  Repair and maintenance of all types of pagers, radios, and base station equipment. The majority of this work was performed to fund college education.

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**PROFESSIONAL**

<b>Memberships and Affiliations:</b>	<b>I.E.E.E. Radio Club of America Chairman - Ericsson Users Group Operational Measurements Subcommittee CTIA - Inter-System Subcommittee</b>
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**PERSONAL**

<b>Marital Status:</b>	<b>Married Two Children</b>
<b>Health:</b>	<b>Excellent</b>
<b>Citizenship:</b>	<b>United States</b>
<b>Other:</b>	<b>Amateur Radio License Private Pilot License</b>

Personal and professional references available upon request.



**ATTACHMENT**